

Date:- 19/12/2012

Sem:- VIth (REV)

Branch:- Bio-Medical

Biomed

BMS

38 : 12.D.nd.mk

Con. 8181-12.

Sub:- Bio-logical modeling
And simulations.

KR-9377

(3 Hours)

[Total Marks : 100

- N.B.** (1) Question No. 1 is compulsory.
(2) Attempt any four out of remaining six questions.
(3) **Figures** to the right indicate full marks.
(4) Draw **diagrams/sketches** wherever necessary.
(5) Use **legible** handwriting. Use **blue/black** ink only.



1. (a) What is significance of modelling ? 5
(b) Explain model of respiratory system. 5
(c) Explain different eye movements. 5
(d) Explain physiology of muscle contraction. 5
2. (a) What is rigor mortis ? 4
(b) With reference to Westheimer's eye model, derive the expression for — 16
(i) maximum displacement
(ii) time to peak
(iii) maximum peak velocity.
3. (a) Draw and explain the setup of voltage clamp experiment. Explain in brief results of these experiments and with the help of necessary equations. State how were the time courses of K^+ and Na^+ currents determined ? 14
(b) Explain physiology of stretch reflex. 6
4. (a) Explain physiology of insulin glucose feedback system. 10
(b) Derive the expression for Nernst equation for Ca^{2+} ions. 10
5. (a) Explain with a block diagram linearized model of immune response system. 10
(b) Explain plant model of thermoregulatory system. 10
6. (a) Explain with a neat block diagram role of golgi tendon and spindle receptor in neuromuscular system. 10
(b) Derive the expression for a conduction of a voltage through a passive axon. Define length constant and its significance. 10
7. Write short note on :— 20
(a) Compartmental modelling
(b) Active state tension generator
(c) Mechanism of thermogenesis and thermolysis
(d) Significance of ion pumps.